SWAN, L. A. and C. S. PAPP. 1972. The common insects of North America. Harper and Row, Publishers, New York, Evanston, San Francisco, London. xiii + 750 pages, text-fig. 1-1422, 8 color plates, 2 appendices, glossary, bibliography, indices of subject and common names and of scientific names. Price $15.00 U. S. A.

According to the authors, the purpose of this volume is to provide an easy way to identify the more common insects of North America north of Mexico, emphasis being placed on comparison of specimens with illustrations. According to a statement by the publishers on the dust jacket, the volume is of "special interest because of its thorough coverage of Canada."

The text consists of an introduction of 32 pages, a "pictured key" to the insect orders and chapters 1 to 23, each dealing with the taxa of a single order.

The introduction, designed to enlighten those potential users of the book who have not had the benefit of formal training in systematic biology or in entomology, explains classification of the animal kingdom and locates the insects and other arthropod classes in the general system. Binomial nomenclature is touched on, and the usual erroneous statement is made that Linnaeus devised this system. Insect structure, function, and development are discussed briefly but reasonably well. Many structural features are illustrated with fully labelled line drawings. The introduction concludes with an excellent, 1.5 page discussion of the value of insects to ecosystems in general, and to man: as pollinators, as agents of biological control of plants and of other insects, and as items of diet.

On page 3, the authors chide "people" who err in that they "do not think of insects as animals . . . ". On page 10, the authors make a similar error when they refer (line 5) to "man and animals." The statement should be "man and other animals."

The authors neglect to inform their readers that because of the small size of most insects, optical equipment might be required to examine a specimen in sufficient detail to make a meaningful comparison with the illustrations and data provided in the text.

In discussing classification, the authors use the terms "broken down" and "divided" to refer to the process of classifying. In reality, classification consists of organizing discrete entities into collective groups, and further grouping of the initial groups. The terms in quotation marks are without meaning in classification.

The "pictured key" consists of 15 pages of illustrations and brief descriptive statements numbered sequentially, about the characteristics of each order. There are no directions for proceeding from one step to the next. A key, on the other hand, is a flow sheet, with specific directions at each point. In this section, pictures there are; key there is not.

Twenty-three orders are treated in the text. It appears that the authors used as a model for the sequence of orders some publication produced prior to 1950. To many it might seem immaterial that an antiquated system is used, but to me it seems unreasonable to return to an arrangement clearly discordant with those proposed in the more recent literature.

The book treats superficially and illustrates specimens of about 1,500 species, about 1.5 percent of the North American insect fauna. The species represent 276 families.

Each family is characterized structurally and biologically in about one half page of text. Within each order, most species represented by figures are numbered. For each numbered species, data given are common name (in boldface), scientific name, geographical range, a brief description of adults (including size in inches to one or two decimal places) and larvae, and some information on biology. Economically important species are noted. For some groups, keys are given (for example, worker termites of eight genera).

The number of species treated per supraspecific taxon depends in part upon conspicuousness of individuals and popularity of the group with collectors. For example, specimens of

296 species of Lepidoptera are figured, included in 44 families. On the other hand, only 111 species of Hymenoptera are figured, included in 35 families. Three of four genera of North American tiger beetles are treated, including 12 species of *Cicindela*. In eight pages, 26 species of coccinellid beetles are treated, and figures are provided of an additional 36 *Hyperaspis*, 11 *Scymnus* and six *Hippodamia* species. Butterflies fare well, also: 153 species, in 51 pages.

In general, the illustrations adequately represent the aspect of the specimen figured. Each figure is numbered, and associated with each is a vernacular name in capital letters, the scientific name in italics and an indication of the size of the specimen. The color plates are technically satisfactory, but they add little of value. Many of the insects illustrated in color have been so illustrated previously.

Appendix I is a four page synopsis of a portion of the geologic time table, beginning with the Devonian Period and ending with the Quaternary, summarizing major geomorphic events (excluding continental drift), and major biological ones, including appearance of the insect orders.

Appendix II is a list of names of orders and families represented in the book. Both this and the glossary are useful.

A volume of this sort might be expected to serve as an entry to point to the entomological literature on identification. Normally, this is accomplished by references in the text keyed to a bibliography. Although the latter is provided, there are no text-references. Thus, a person wanting to know more about, say dragonflies, has to fumble through 17 pages of references to discover the publications by Needham and Westfall, and Walker.

The bibliography comprises two portions: one, labelled "General," the other, "Technical." This distinction eludes me because the categories must overlap by definition (many "general" works must also be "technical") and because I was unable to discern criteria used by the authors in assigning publications to one of the two groups. But this is a minor objection. More important, the basis for inclusion or exclusion of references is not apparent. It seems that no systematic effort was made by the authors to list the recent taxonomic literature of major consequence to their work, or to be consistent about what was included. For example, Swain's "Insect Guide" was included, but the more recent "Field Guide to the Insects" by Borror and White was excluded. "A Key to the Wyoming Grasshoppers" was included, but the "Acridoidea of southern Alberta, Saskatchewan and Manitoba" was excluded. The revision of *Meloe* by Pinto and Selander was included, but the revision of the meloid genus *Epicauta* by Werner was excluded. A list of this type could be extended. Another criticism is that no consistent sequence is used for listing several publications by the same author: for some, the earliest publication is listed first; for others, the latest; for still others, no arrangement is perceivable.

The planning denied to preparation of the bibliography is further illustrated by the body of information associated with the periodical cicadas. The authors devote a bit more than two pages of text to these species (pages 133-135), including a map and a table, based on a USDA Economic Insect Report (cited in the text, but not in the bibliography). In spite of the importance accorded by the authors to this species complex, they do not cite the important taxonomic paper by Alexander and Walker entitled "Evolutionary relationships of 17-year and 13-year cicadas . . . ", in the Miscellaneous Publications, Museum of Zoology, University of Michigan, No. 121, 1962.

The bibliography would be of greatest value if the publications were arranged by taxonomic groups because the purpose of this book is to enable a person to identify insects; part of this task is to locate relevant references. In spite of these shortcomings, I found this section interesting because it contains references to many papers that had previously escaped

my notice.

How does one distinguish a "common insect" from an uncommon one? The authors neglect to provide this information, and thus do not inform the readers of the basis for inclusion or exclusion of taxa. For the beetles, I think I was able to deduce one of the criteria, by comparison of illustrations with those in Jaques' book, "How to know the beetles." There was a remarkable degree of overlap among the species illustrated (and remarkable similarity of illustrations of the same species between the two books). Also, illustrations of ichneumonids are strikingly similar to those in "Ichneumon flies of America north of Mexico" by Townes and Townes. I suggest that one of the criteria for inclusion of a species was that it had been illustrated in a previous publication. The illustrations were no doubt drafted by the authors, but I believe that many were based on previously published illustrations rather than on insect specimens.

Comparison with illustrations in a book is a successful technique of identification only when the taxa of most specimens that might be referred to it are represented therein by figures. If a person who uses the book cannot know what a "common insect" is he cannot know that a specimen in hand represents a species described in that book. Because criteria for commonness are not established, specimens of any of the 90,000 or so species of North American insects might be referred to this volume which deals with only about 1,500 species. Because of the resulting low degree of probability of actually being able to identify insects to species with this book, and because the authors place emphasis on species identification, the volume seems of limited value for its announced purpose – and so I believe it is. It could play a useful role in identification of higher taxa, but for this purpose its coverage is limited.

A book of moderate size intended to guide one in identifying material drawn from a large fauna should not pretend that its operational level is the species. The family level is realistic. Borror and White's "A Field Guide to the Insects of America north of Mexico" (Houghton Mifflin Company, Boston) is a guide to the families. It is concisely written, superbly illustrated by drawings based on specimens, has a list of references arranged by taxa, and costs only $5.95. This is the volume for anyone needing to make identifications, who does not recognize the families at sight.

What is the value of "The Common Insects of North America" for Canada? I bring up this point only because of the publishers' statement about "thorough coverage" of this fauna. The coverage is in no sense thorough. Some important forest and crop pests in Canada are not mentioned, and for those that are, brief notice is given and little of it is specifically relevant to Canada. For many species, there is no indication as to their Canadian distribution. I do not blame the authors for this misstatement. It is just one more example of "truth in advertising" as this concept is currently understood by North American business interests. It is a pity that authors need risk their reputations by association with firms whose advertising personnel are unable or unwilling to distinguish between truth and falsehood.

Who needs this book? Entomological bibliophiles and libraries intent upon acquiring complete holdings of entomological literature need it. The experienced entomologist, amateur or professional, who understands its severe limitations, might like to have a copy because the many illustrations facilitate identification, or one might find an interesting reference by browsing through its bibliography. The book, I think, creates its own niche, rather than filling one based on need of those interested in entomology.

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